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(54) Abstract Title
Conjugated linoleic acid for weight reduction in a dog

(57) A weight-reducing dietary composition for a dog comprises conjugated linoleic acid (CLA). The CLA may be present substantially as cis-9, trans-11 octadecadienoic acid. The CLA may be present in the composition at a concentration of 3.5-7.0 g/kg, preferably 7.0 g/kg. The composition may comprise a palatable mix of raw materials such as rice, fish and vegetable matter, particularly wheat, maize or soya. It may also be high in dietary fibre, comprising one or more of beet pulp, fructose oligosaccharides or wheat fibre, and may also contain vitamins, minerals, preferably in chelated form, and trace elements. The composition may comprise an outer coating of a duck-based digest, its moisture content may be less than 6% by weight and it may be in extruded form. A method of reducing weight in an obese dog comprises feeding the dog such a composition, preferably giving about 0.15 ml per Kg of body weight and exercising the dog.

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The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

- 1 -

DIETARY COMPOSITION

The present invention relates to a dietary composition for animals, especially dogs, and in particular to a composition for use in weight reduction.

Conjugated linoleic acid (CLA) was discovered in 1970 by Steinhart (Steinhart, C., (1996) Journal of Chemical Education 73, 302-303) and has been used as a human dietary supplement. It has also been proposed for use as an anticarcinogenic agent, in treating cardiovascular disease, as an antioxidant and to counter the negative effects of linoleic acid (Cesaro, A., et al (1998) Anticancer Research 18, 1429-1434). The pharmaceutically active isomer of conjugated linoleic acid is believed to be *cis*-9, *trans*-11 octadecadienoic acid (Ha et al., Cancer Research 50 1097-1101 (1990).

In addition, CLA is thought to be useful in helping to reduce weight and promote muscle mass, and in recent years it has gained popularity as a dietary supplement for humans for this purpose. For example, CLA is marketed as a human dietary supplement under the trade name TONALIN.

There have been some studies on the effect of CLA in mice and chickens (see, for example, Pariza, M.W. et al FASEB Journal 11, 139A (1997)) to provide animal models for the likely effects of CLA in humans.

We have now found that CLA is very useful as a dietary supplement for dogs in order to effect a weight reduction. In particular, we have found that when CLA is used in conjunction with a normal pet food, there is an increased rate of weight loss in dogs fed the CLA-supplemented diet when compared to controls. Accordingly, in one aspect, the present invention provides a weight-reducing dietary composition for a dog, which composition comprises conjugated linoleic acid.

One of the main problems with pet obesity is in getting the compliance and agreement of the pet owner both to implement a reduction in obesity and to maintain their pet on a weight-reducing diet for a sufficient period. In this respect, one problem with presently available dietary compositions that are purported to reduce body weight in the dog is that many of these compositions seem to lack palatability. It is, therefore, difficult to maintain compliance of the dog to feed on such compositions over a sufficient period of time for the composition to be of value in reducing body weight. Another problem arises from the perceived lack of effectiveness of these compositions, particularly in the early period of dieting. It will be understood by those skilled in the art that in order to effect a genuine and sustained weight reduction in the dog it is generally necessary to diet the obese dog slowly. Rapid or "crash" dieting typically results in the lost weight being put back on very quickly after the period of dieting. However, one consequence of slower, more gradual dieting with the prior art compositions is that particularly during the early period of the diet there is often no visually-noticeable weight loss. Owners frequently assume, therefore, that the composition is ineffective and thus discontinue the diet. Thus, it is difficult to ensure compliance of the owner to maintain their dog on the diet for a sufficient period. We have found,

however, that CLA-containing dietary compositions of the invention can be sufficiently palatable and effective, particularly in the early period of dieting, to maintain both pet and owner compliance over an adequate period of time.

Thus, in a second aspect of the present invention, there is provided a weight-reducing dietary composition for the dog, which composition comprises conjugated linoleic acid and a palatable mix of raw materials. Preferably, the mix has a lower caloric value than a corresponding quantity of a typical dog food. By typical dog food, we mean standard, non-specialised dog foods which are commonly fed to dogs by pet owners.

We have found the dietary compositions of the invention to be particularly effective at reducing the weight of the obese dog and in helping to return the body shape to normal. The CLA-containing compositions of the invention promote a rapid loss in fat, particularly from obvious, visually-noticeable parts of the dog in addition to loss from less-noticeable (for example, internal) parts. With the present compositions there is a visually-noticeable weight reduction even during the early stages of dieting. In addition, the present dietary compositions are also highly palatable. These advantages have been found to substantially overcome the problems of compliance encountered with previous weight-reducing compositions. Owing to the effectiveness and high palatability of the present compositions, we have found that dog owners are encouraged to maintain feeding of the compositions to their dog over substantial periods of time. As a result of this compliance over long periods, substantially all of the necessary weight-reduction can be achieved with the present compositions.

A preferred feature of the present compositions is to use a particular blend of raw materials so as to increase the rate of passage of food through the intestine. This increased rate of passage reduces the quantity of food that is absorbed by the gut and thereby reduces the overall caloric intake of the dog. Consequently, weight-reduction is promoted. The inclusion of

conjugated linoleic acid in the composition further increases this caloric restriction and thus serves to enhance body-weight and body-fat reduction still further. Thus, in the present dietary compositions, a combined effect of a balanced blend of raw materials and of conjugated linoleic acid can serve to promote weight reduction in the dog. The combination increases both the rate and extent of weight loss.

In the preferred compositions of the invention, a balanced blend of raw materials is used with the conjugated linoleic acid. We prefer to base the blend of raw materials on a mixture of rice, fish and vegetable matter including, for example, wheat, maize and soya. Other suitable vegetable sources include those which are such as to provide a sufficient amount of protein in the composition. Preferably, the composition is relatively high in dietary fibre. For example, beet pulp, fructose oligosaccharides (FOS) and wheat fibre can be used as sources of dietary fibre. It is preferred to supply the dietary fibre from a mixture of suitable sources. In the preferred compositions, a preferred way of achieving high palatability is to apply a duck-based digest as an outer coating to the product.

Owing to the effect of reduced gut absorption with the compositions of the invention, we prefer to include essential nutrients, vitamins and trace elements in the composition in order to ensure proper maintenance of the dog. For this purpose, any mineral and vitamin supplement can be used. The use of chelated minerals is preferred, since these bypass normal uptake mechanisms and thus in this way it can be ensured that mineral uptake is adequate. Preferred vitamin and/or mineral supplements are such so to meet the requirements of the dietary throughput rates and processing effects. The inclusion of essential nutrients in the dietary composition along with a mix of dietary fibre serves to supply gut and immune function.

The precise quantity of conjugated linoleic acid included in the composition can vary, although we prefer to include from about 3.5 to 7.0

grams of conjugated linoleic acid per kilogram of composition. A higher level is most preferred, for example 7.0 g/kg. We have found that the supply of about 0.15 ml of conjugated linoleic acid per kilogram of body weight is particularly effective at promoting a reduction in body weight in the dog. In the present composition, conjugated linoleic acid is provided as the isomer cis-9, trans-11 octadecadienoic acid.

For a medium to large dog we have found that the amount of dietary composition needed to provide both adequate nutrition and to promote a good rate of weight reduction is approximately 10-12 grams per kilogram of body weight. It will be understood by those skilled in the art that greater or lesser amounts may be used depending on the exact size and type of dog.

In order to enhance the weight-reducing effect of the present dietary composition, we prefer to supplement the diet with a moderate exercise regime. The present invention thus encompasses a "weight-reducing package" for a dog, which package includes the provision of a dietary composition accordingly to the invention and a suitable exercise programme.

The present compositions can be formulated according to procedures well known to those skilled in the art. In preparing the dietary compositions, conjugated linoleic acid is typically blended with, for example, wheat feed in order to form a fat premix. Typically about 3.5-7.0kg of conjugated linoleic acid (per tonne of composition) is blended with about 2.5kg of wheatfeed in order to form the premix. The fat premix can then be blended with the remaining ingredients of the composition in a suitable mixer. The mixture is typically then extruded, preferably to give an extrudate with a moisture content of less than about 6% by weight. The extrudate is preferably cut into a cube shape.

In order that the present invention may be more fully understood, one suitable weight-reducing dietary composition according to the invention is given below.

EXAMPLE 1

| <u>Ingredient</u> | <u>% (by weight)</u> | <u>kg</u> |
|----------------------------|----------------------|---------------|
| Rice | 25 | 250 |
| Wheat | 12.2 | 122 |
| Wheatfeed | 12.5 | 125 |
| Soya (dehulled) | 10.0 | 100 |
| Maize gluten 60 | 10.0 | 100 |
| Duck digest outer coat | 10.0 | 100 |
| Maize | 5.0 | 50 |
| Norse Fish meal (ECO LT) | 4.0 | 40 |
| Dical (Aliphos 40) | 3.75 | 37.5 |
| Yeast | 2.5 | 25 |
| Peas | 2.0 | 20 |
| Linseed | 1.0 | 10 |
| CLA | 0.7 | 7 |
| Vitamin mineral supplement | 0.625 | 6.25 |
| Charcoal | 0.5 | 5 |
| Fos | 0.4 | 4 |
| Salt | 0.2 | 2 |
| Total | <hr/> 100.375 | <hr/> 1003.75 |

CLAIMS

- 1 A weight-reducing dietary composition for a dog, which composition comprises conjugated linoleic acid.
- 2 A composition according to claim 1 wherein the conjugated linoleic acid is present substantially as the isomer *cis*-9, *trans*-11 octadecadienoic acid.
- 3 A composition according to either claim 1 or claim 2, wherein the conjugated linoleic acid is present at a concentration of from 3.5 to 7.0 grams per kilogram of said composition.
- 4 A composition according to claim 3 wherein the concentration of conjugated linoleic acid is 7.0 grams per kilogram of said composition.
- 5 A composition according to any one of claims 1 to 4 which composition comprises a palatable mix of raw materials.
- 6 A composition according to claim 5, wherein the mix of raw materials includes rice, fish and vegetable matter.
- 7 A composition according to claim 6, wherein the vegetable matter includes one or more of wheat, maize or soya.
- 8 A composition according to any of claims 5 to 7, which composition is high in dietary fibre.
- 9 A composition according to claim 8 which composition comprises one or more of beet pulp, fructose oligosaccharides or wheat fibre as a source of dietary fibre.

10 A composition according to any preceding claim, which composition comprises essential vitamins, minerals and trace elements.

11 A composition according to claim 10 wherein the minerals are in chelated form.

12 A composition according to any preceding claim, which composition comprises an outer coating of a duck-based digest.

13 A composition according to any preceding claim, wherein the moisture content is less than 6% by weight of the composition.

14 A composition according to any preceding claim, wherein the composition is in extruded form.

15 A method of reducing the weight of an obese dog, which method comprises feeding to the dog a composition according to any one of claims 1 to 14.

16 A method according to claim 15, wherein said obese dog is supplied with about 0.15 ml of conjugated linoleic acid per kilogram of body weight.

17 A method according to claim 15 or claim 16, which method further comprises exercising the dog.

18 A weight-reducing dietary composition for a dog substantially as described in Example 1.



INVESTOR IN PEOPLE

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A2B (BMA9, BMDE1, BMDE9)

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Other: EPODOC, WPI, JAPIO, CAPLUS, FROSTI, AGRICOLA, FSTA

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| X | EP 0950410 A1 (CONLINCO) see esp. paragraph 5 on page 2, line 47 on page 5 and pages 37 and 38 | 1, 2, 5-10, 13, 15 |
| X, Y | WO 99/66922 (REMMEREIT) see esp. line 20 of column 3, lines 21-35 of column 4 and lines 40-50 of column 8 and Example 9 | X: 1, 2, 5-10, 13-15 Y: 3, 4, 16 |
| X | FR 2774263 (GOURDEL and TRONEL) whole document | 1, 2 |
| Y | US 5554646 (COOK at el.) see esp. lines 9-13 and 31-36 of column 5 and Examples | 3, 4, 16 |

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.